

ANAPLASMOSIS OF CATTLE

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Anaplasmosis, an infectious blood disease of cattle, takes a toll in animal lives and in beef and milk production which is difficult to measure. The U. S. Livestock Sanitary Association has estimated the loss at \$35 million an average year. However, little research information is available by which to judge the cost of the disease, other than in fatalities.

Anaplasmosis has been known as a distinct disease for over half a century. It has doubtless been in this country for much longer.

The disease has been studied in various parts of the world for several decades and much knowledge has been acquired. However, important gaps remain — the classification of the organism causing anaplasmosis, the organism's life cycle and how to save acutely ill cattle.

However, great progress has been made through research and field tests in the past decade. A practical, specific test for the disease is an important tool now available. Progress has been made in providing a method of immunizing cattle, and some specific herd-management techniques hold possibilities for cutting down the disease and protecting animals from infection. Antibiotic treatments are now available for protecting animals during an outbreak and for removing the infection from carrier animals.

DESCRIPTION OF THE DISEASE

In the early stages of an acute infection, the body temperature may rise 2 to 5 degrees F. and remain at 103 to 107 degrees F. until the animal begins to improve. But, if the infection is overwhelming, the temperature may drop below normal just before death. Heart beat may double in rate. Breathing may more than double in rate and become labored. As much as 60 to 75 percent of the red blood cells may be destroyed when the animal first appears sick.

When the red cell numbers drop to as low as one-third of normal, the animals are in grave danger and usually die.

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If the acutely infected animal survives the peak of cell destruction and the formation of new red cells exceeds the rate of destruction, convalescence usually follows and may continue for several months. The period of convalescence is governed to some extent by the rate of red cell generation, by the presence or absence of secondary complications and by treatments given. Blood transfusions are sometimes given to help the recovery of valuable animals. Young animals generally produce red cells faster than do older animals and also respond more satisfactorily to blood transfusions.

Aside from the occasional relapse during convalescence, the animal maintains a certain relative resistance to reinfection — that is, resistance to any new introductions of the parasite so long as some degree of infection remains. This condition is termed "premunity." The resistance depends on the continued presence of the parasite, rather than a lasting supply of protective antibodies, such as many bacterial and viral pathogens stimulate.

Animals that survive infection become carriers. Although the animal shows no further signs of the disease, its blood is infectious. Such animals generally remain carriers for life, thus posing a threat to other animals. Any carriers freed of the parasite either naturally or through medication become susceptible again. Many exposed animals, especially the young, become carriers without experiencing acute anaplasmosis or having visual symptoms of the disease, since body defenses are able to hold parasitism to a minimum.

The disease agent, *Anaplasma marginale*, called a marginal body or anaplasma body, may appear near the margin of the red blood cells 15 to 45 days after the animal becomes infected. That body appears spherical and is barely visible under standard microscopes. After becoming detectable in the blood, these bodies increase in size and double in number about every 24 hours for several days. The bodies are usually visible for a week or 10 days; then they gradually disappear as the affected blood cells are destroyed and removed from the blood stream by the animal's body. The severe loss of red cells is considered the main cause of death.

Most believe that the marginal body is the parasite and that its growth in size suggests a developing organism. In support, they cite electronmicroscopic studies which indicate that the anaplasma divides into parts in the manner of a bacterial or protozoan cell.

DISTRIBUTION AND INCIDENCE

Anaplasmosis is a problem in about 25 states in the South and West. It is not often recognized in other areas, although infection may occur occasionally.

The incidence of the disease appears to fluctuate as the activity and population of insect and tick vectors increase and decrease with changing weather.

The accompanying map shows the distribution and the general incidence of the disease based on these surveys and on animal-disease reports from practicing veterinarians and others familiar with anaplasmosis. Significant numbers of infected cattle were found in all of the shaded areas, but not in every part of them. Some unshaded areas have scattered reactors.

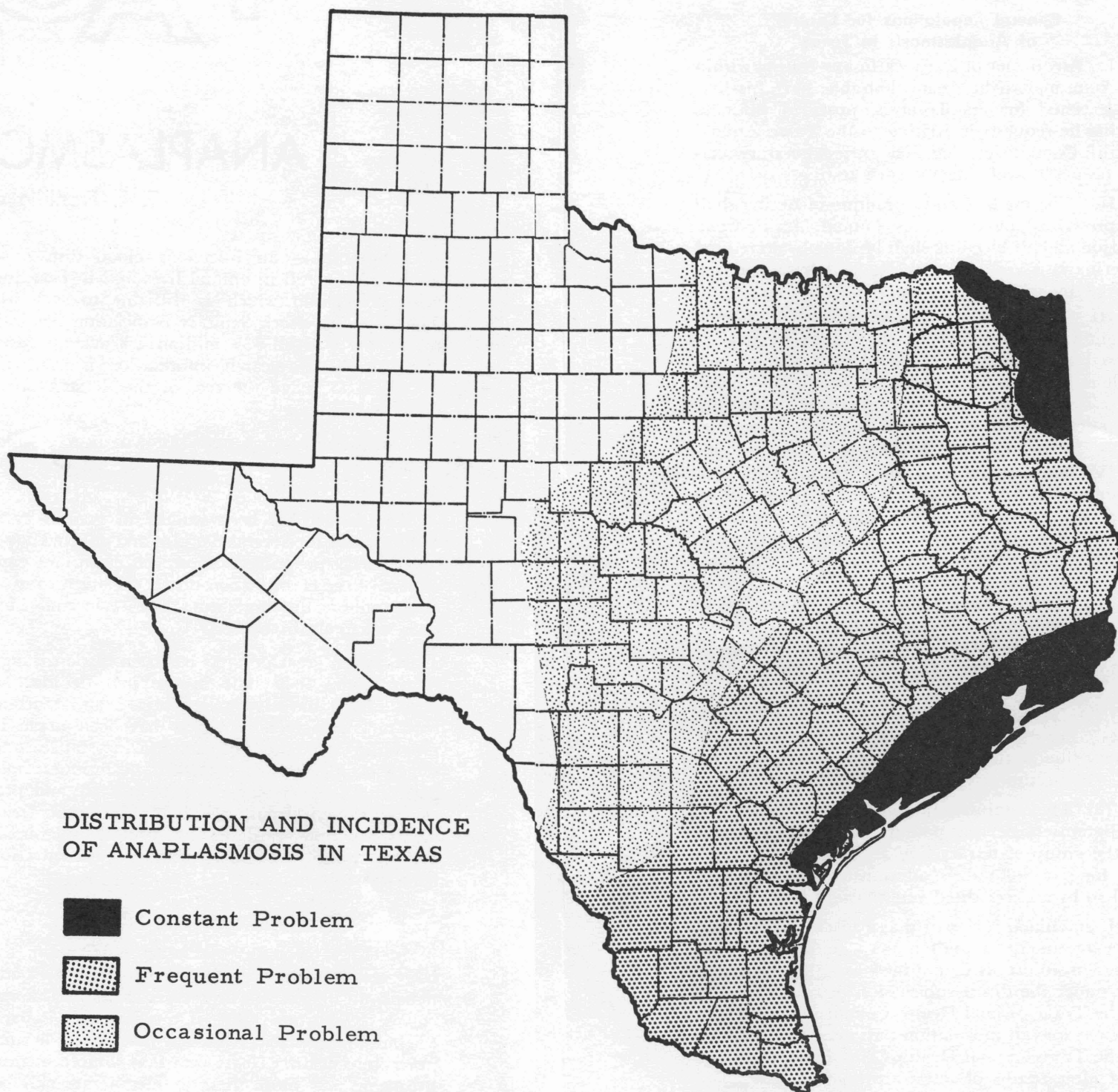
TRANSMISSION

Cattle sometimes transmit the disease to their young before birth, but not by contact or through feces or urine.

Anaplasmosis can be spread from infected to susceptible animals in two ways. Infected blood may be transferred mechanically by insects or on instruments used by man in dehorning, castrating, ear notching, tattooing and other operations. Mechanical transmission takes place only when the disease agent is delivered promptly — that is within about 5 minutes. The perishability of the organism greatly limits the time and distance insects or instruments can carry the disease.

The other means of transferring the disease is biological. In this type of transmission, certain ticks feed on infected animals and pick up the organism with the blood they consume. The organism is able to survive for a long time in the tick's body and can infect other animals during subsequent feeding of the ticks.

Natural vectors are the most important means of transmitting. The only ticks in Texas which have been shown to transmit anaplasmosis are the brown winter tick (*D. nigrolineatus*), the American dog tick (*D. variabilis*), and the black-legged tick (*I. scapularis*). The brown winter tick is common in the Edwards Plateau region, and reports of anaplasmosis in the winter and early spring months would stimulate suspicion at this species.



Some ticks can pick up the disease organism in one stage of their life cycle and transmit it in a later stage. In experiments, certain ticks have even passed it through their eggs to the second generation of ticks and from them to cattle.

In Texas, other blood-sucking insects, particularly horse flies, appear to be chiefly responsible

for spreading anaplasmosis. Stable flies, deer flies, horn flies and mosquitoes are suspected but insufficiently studied as to their vector role.

In addition to the vector problem, an important contributing factor in the spread of anaplasmosis is the practice of shipping cattle long distances. Long-distance hauling and concentration of animals

at numerous points have provided ideal conditions for vectors spreading the disease. Infected cattle carry the disease into noninfected areas. Noninfected cattle are exposed to the disease when moved into infected areas.

DIAGNOSIS

Diagnosis by observation of the animal is handicapped by the similarity of certain other diseases. However, excessive urination and constipation, especially when occurring together, suggest advanced anaplasmosis. Jaundice is common in such cases. Acute anemia in young animals may result from several diseases, but in an anaplasmosis area, acute anemia in older cattle suggests anaplasmosis.

The complement-fixation (C.F.) test helps in diagnosis. It gives a high degree of accuracy in diagnosis and can detect new infections before the animal becomes visibly ill. A relatively recent test — the capillary agglutination (C.A.) test — has been developed and is now being used in diagnosis.

TREATMENT

Considerable study has been conducted to determine the effectiveness of antibiotics in the treatment and prevention of anaplasmosis. Drugs in the tetracycline group (Aureomycin and Terramycin) have been found to be of value in treating acute or sub-acute cases. However, their greatest value is in protecting susceptible animals and in freeing animals of the carrier state. Tetracyclines will prevent animals from becoming infected when fed at the level of 0.5 grams per 1,000 pounds of body weight continuously through the heavy insect season. A level of 5 grams of tetracycline antibiotics given daily by injection will clear up carriers after 10 days treatment. In considering treatments, the local veterinary practitioner should be consulted and the measures carried out under his supervision. This is particularly important when dairy cattle are involved to prevent drug residues in market milk.

Several supportive treatments for sick animals commonly are used. Transfusions of 2 to 3 gallons of citrated whole blood have been used with variable results. Blood transfusions may hasten recovery in early acute or sub-acute cases if the animals can be handled without excessive excitement. It is doubtful that transfusions save many gravely sick animals from death. Certain arsenicals have some value in stimulating the production of red blood cells and correcting anemia. Glucose injections help restore body moisture and energy. Laxatives are sometimes used to relieve constipation. Simple, good nursing on green pasture is often prescribed without treatment for weak and

anemic animals which cannot tolerate the exertion of restraint for treatment.

GETTING RID OF ANAPLASMOSIS

Each year cattle owners face the problem of what to do about anaplasmosis. Fortunately, research has opened courses of action not understood only a few years ago. But the condition of the animal, the herd and the area environment determines the practical recourse.

Good results have been achieved by isolating infected animals from healthy ones in field trials. Recent information about the vectors of the disease suggests that such isolation, plus control of the known vectors, and antibiotic feeding, may be a practical means of ridding herds of anaplasmosis. Field experience indicates that continuous feeding of chlortetracycline (Aureomycin) at a level of 0.5 grams per 1,000 pounds of body weight for 120 days during the winter feeding period will eliminate the carrier state of anaplasmosis.

Recently, a vaccine for anaplasmosis has been released for distribution through veterinarians. The vaccine will prevent severe illness in animals that become infected with the disease. Although the vaccine does not cause infection in inoculated animals, it does cause them to react positively to the C.F. test for several months. The manufacturer recommends that the vaccine be given in two doses spaced 6 weeks apart and a booster dose be administered annually. For details contact your veterinarian.

Success of a program for eliminating anaplasmosis from a herd by antibiotic treatment would depend on protecting the herd from reintroduction of the infection. In the area of the State in which the disease is prevalent (see map), this approach probably should only be used on an area, rather than an individual herd basis.

Anaplasmosis eradication plans should be reinforced by efforts to keep animals out of low, swampy and brushy areas during the insect season to minimize exposure to possible contact with insects and ticks capable of transmitting the disease. Spraying or dipping cattle on a regular schedule also offers an important measure of protection from vectors. For recommendations on chemical control of vectors obtain a copy of "Texas Guide for Controlling Insects on Livestock and Poultry" from your county agricultural agent.

The following program has been provided by the Texas Animal Health Commission for freeing individual herds of anaplasmosis infection:

General Regulations for Control of Anaplasmosis in Texas

I. Any owner of livestock in any county within the State may, if he deems desirable, have his livestock tested for anaplasmosis, provided prior to testing he requests in writing to the Texas Animal Health Commission that diagnostic laboratory service be made available for such testing.

II. The method and technique of testing shall be prescribed by the Texas Animal Health Commission and all bleeding shall be done by accredited veterinarians and the tests run at laboratories approved by said Commission.

III. Animals found to be infected with anaplasmosis, as indicated by the results of the approved test, shall be fire branded on the left jaw with an A at least 3 inches in height and shall, thereafter, not be sold for other than slaughter purposes without permission in writing from the Texas Animal Health Commission.

IV. Since there is a known treatment for anaplasmosis, owners will be allowed a period of 15 days between receipt of the laboratory results by the veterinarian and time of branding. During this period the owner may elect to treat reactor animals and upon written request to the Texas Animal Health Commission permission will be granted to delay branding until treatment can be effected and a retest conducted 120 days following completion of the treatment. Such treatment shall consist of:

(1) The administration of five (5) milligrams (mgs.) per pound of body weight of one group of tetracycline antibiotics parenterally each day for ten (10) consecutive days, or

(2) The administration of three (3) to five (5) milligrams (mgs.) per pound of body weight of one of the group of tetracycline antibiotics orally each day for sixty (60) days, administered by and certified to by an accredited veterinarian.

If an animal is classified as a reactor upon retest after treatment, branding may be delayed until status of animal is determined by calf inoculation test under the direct supervision of representatives of the Texas Animal Health Commission. Written requests for calf inoculation tests must be submitted to the Texas Animal Health Commission within 15 days after results of retest are known.

V. The Texas Animal Health Commission may upon receipt of a written request, permit the sale of identified anaplasmosis reactors to individuals, companies and corporations already having identified anaplasmosis reactors on their premises.